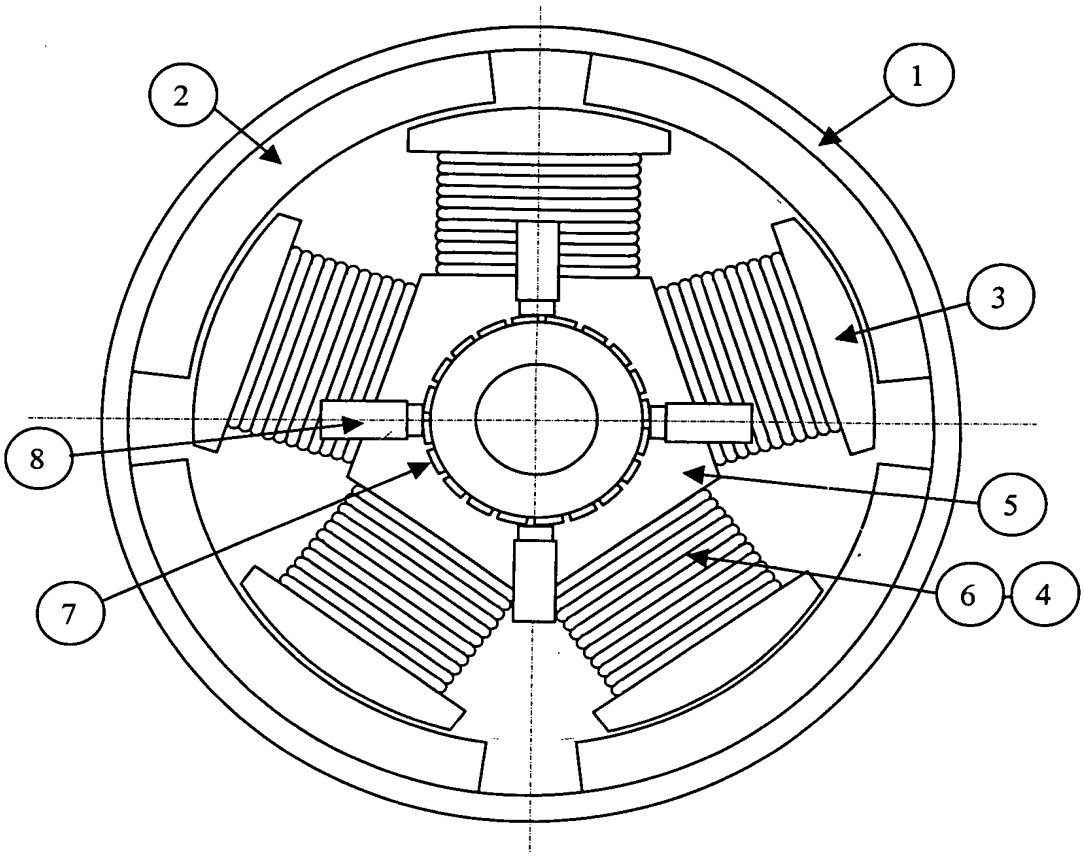


Fig 1

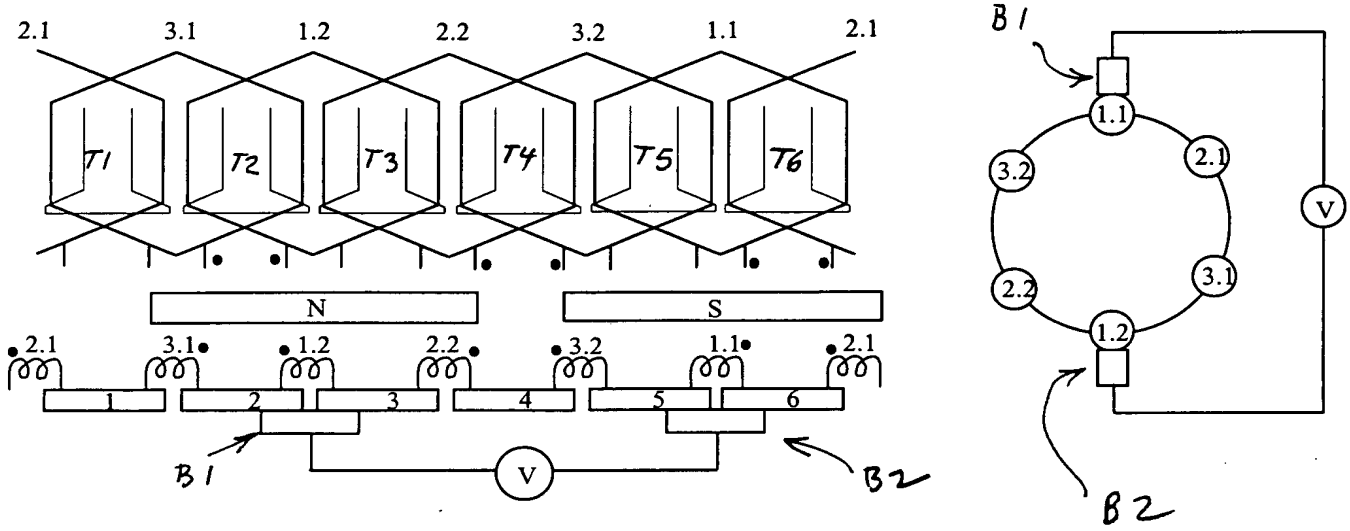


Fig 2 : Diagram of a machine with 6 rotor slots, 2 stator poles, 6 commutator segments, 2 brushes with a simplex lap winding and a short pitch of 120 electric degrees

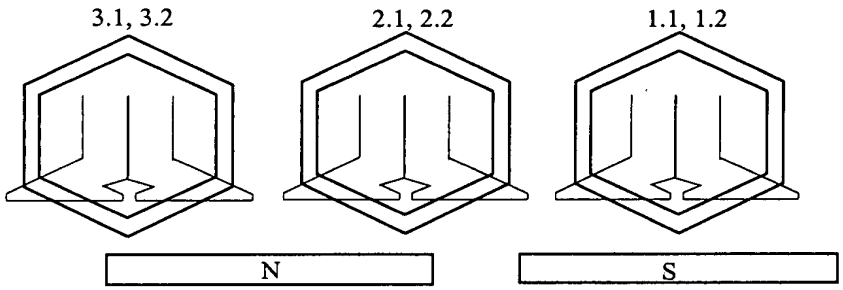


Fig 3 : Diagram of construction of a machine equivalent to the machine of Fig 2 with a rotor winding made of concentrated windings wound around the teeth

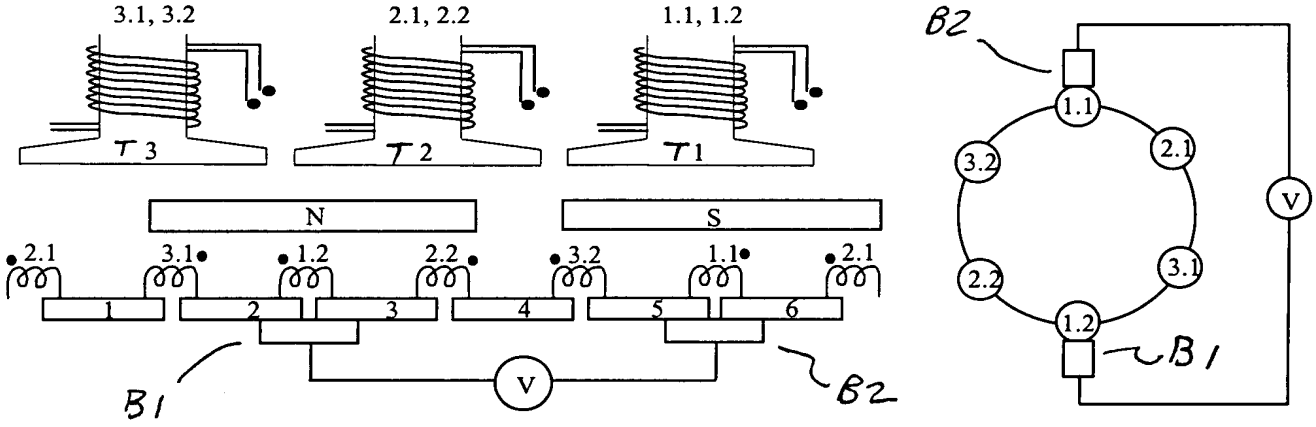


Fig 4 : Diagram of a machine with 3 rotor slots, 2 stator poles, 6 commutator segments and 2 brushes with a rotor winding made of concentrated windings wound around the teeth

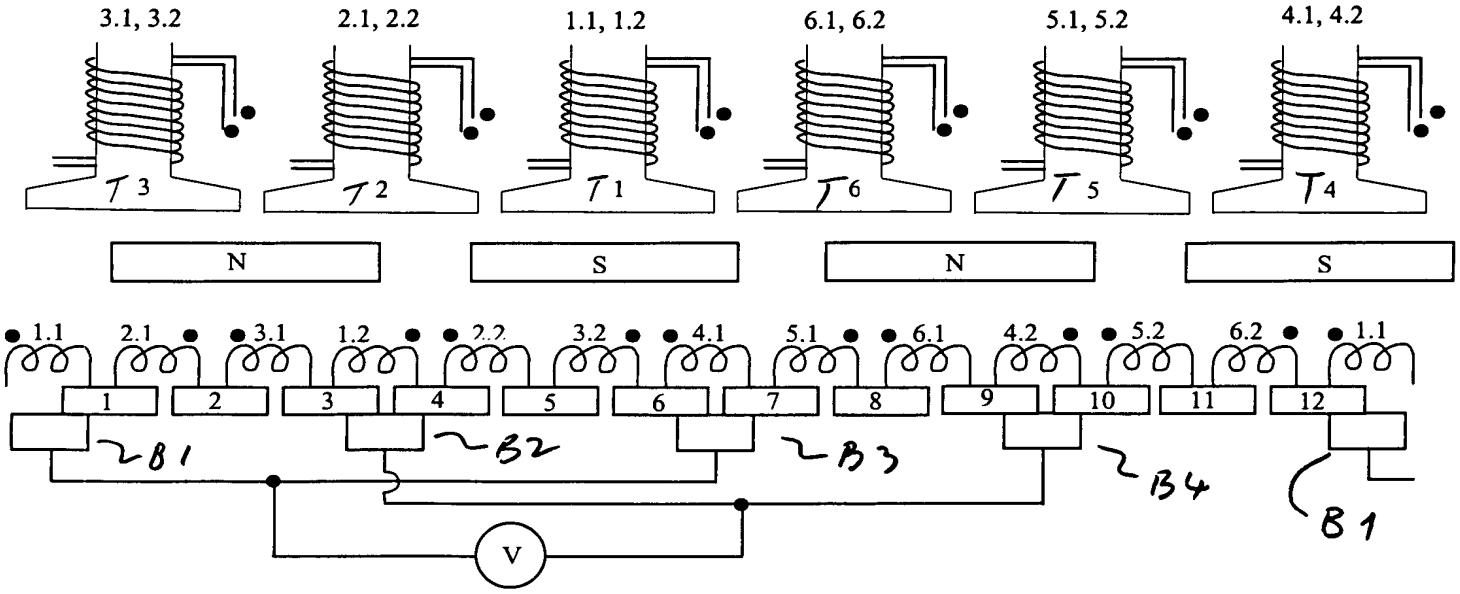
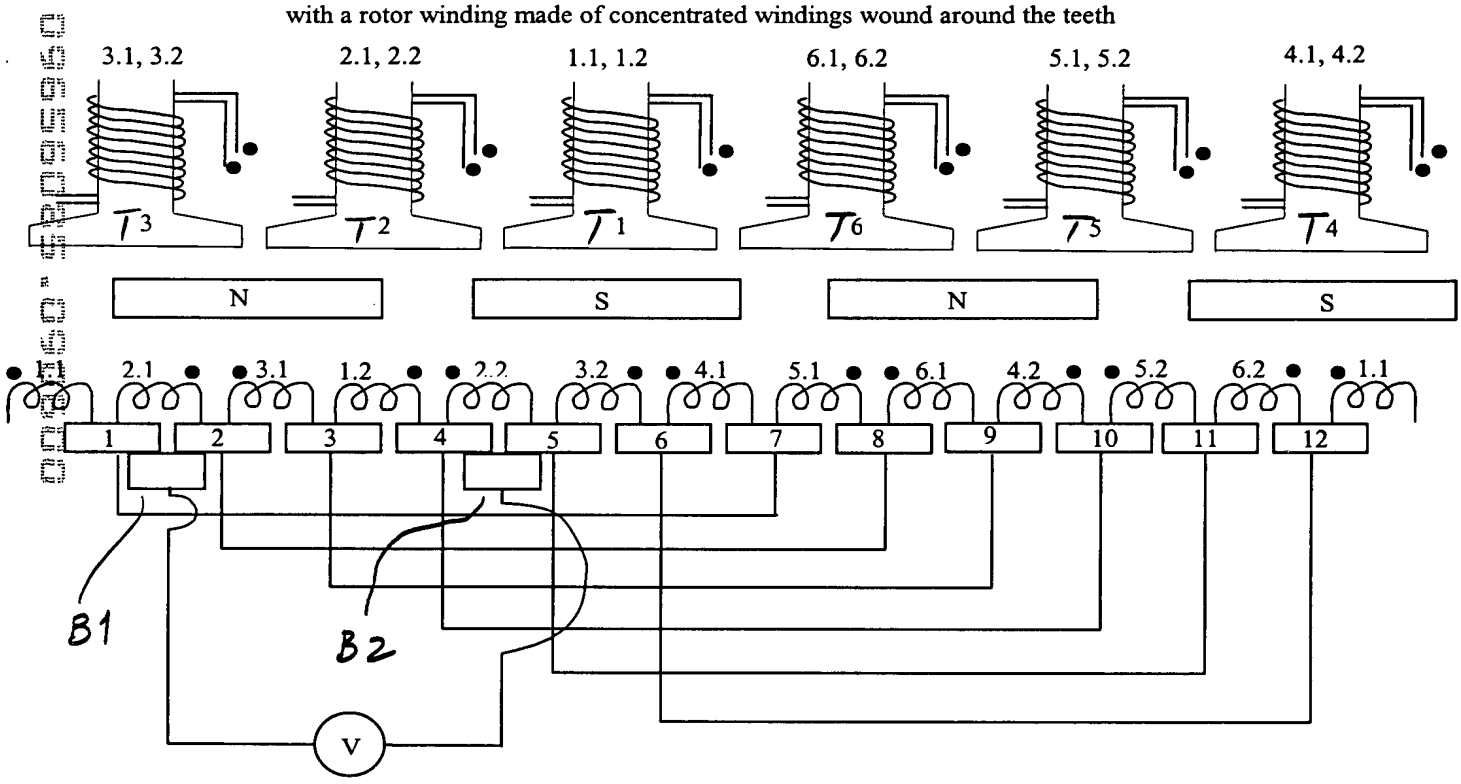


Fig 5 : Diagram of a machine with 6 rotor slots, 4 stator poles, 12 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth



. Fig 6 : Another diagram of a machine with 6 rotor slots, 4 stator poles, 12 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth and equalizer connections on the commutator

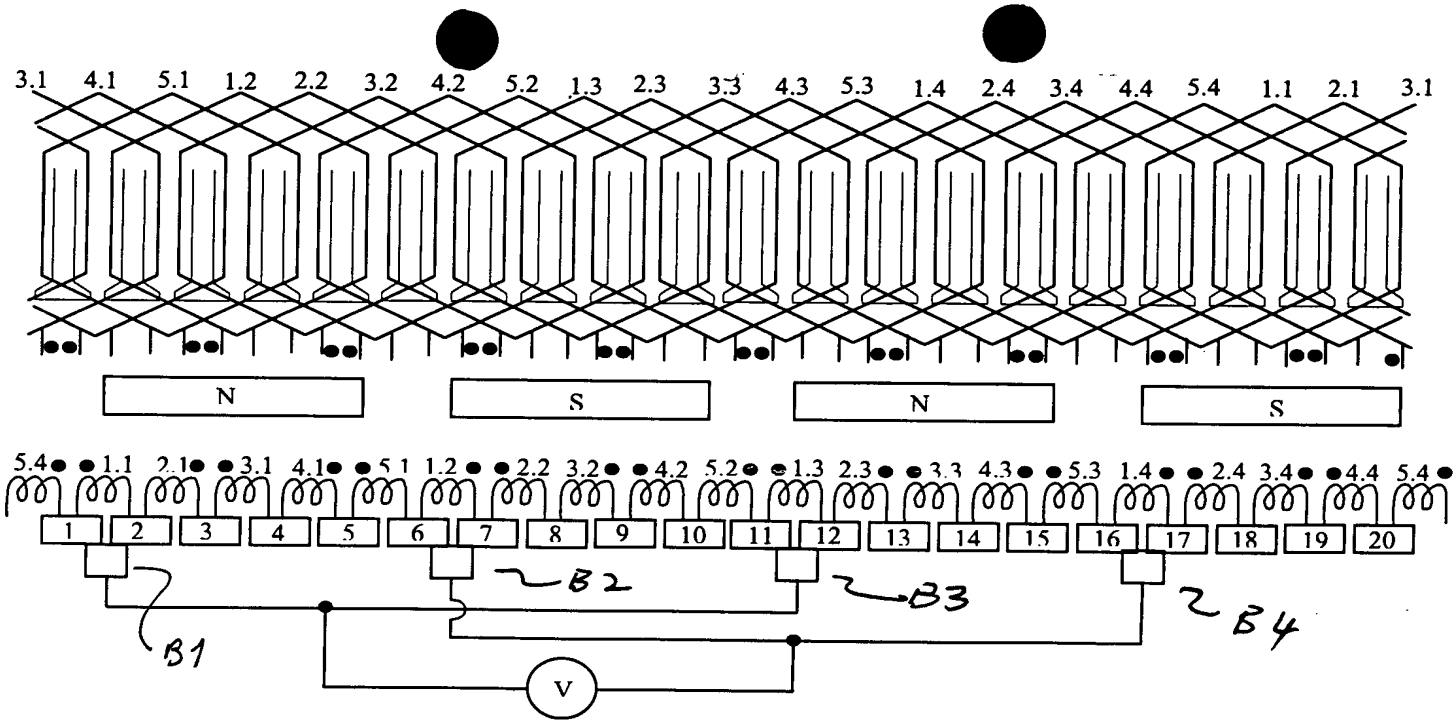


Fig 7 : Diagram of a machine with 20 rotor slots, 4 stator poles, 20 commutator segments, 4 brushes with a lap winding and a short pitch from 1 to 5

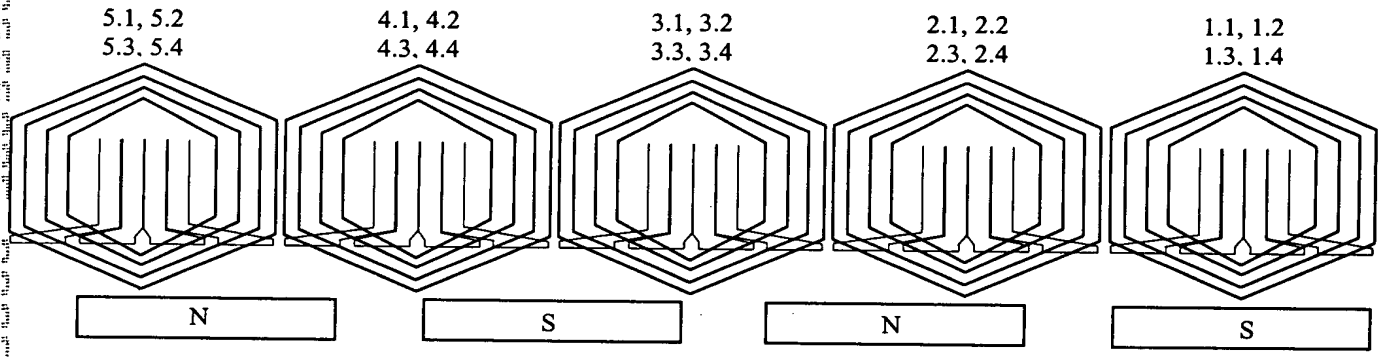


Fig 8 : Diagram of construction of a machine equivalent to the machine of Fig 7 with a rotor winding made of concentrated windings wound around the teeth

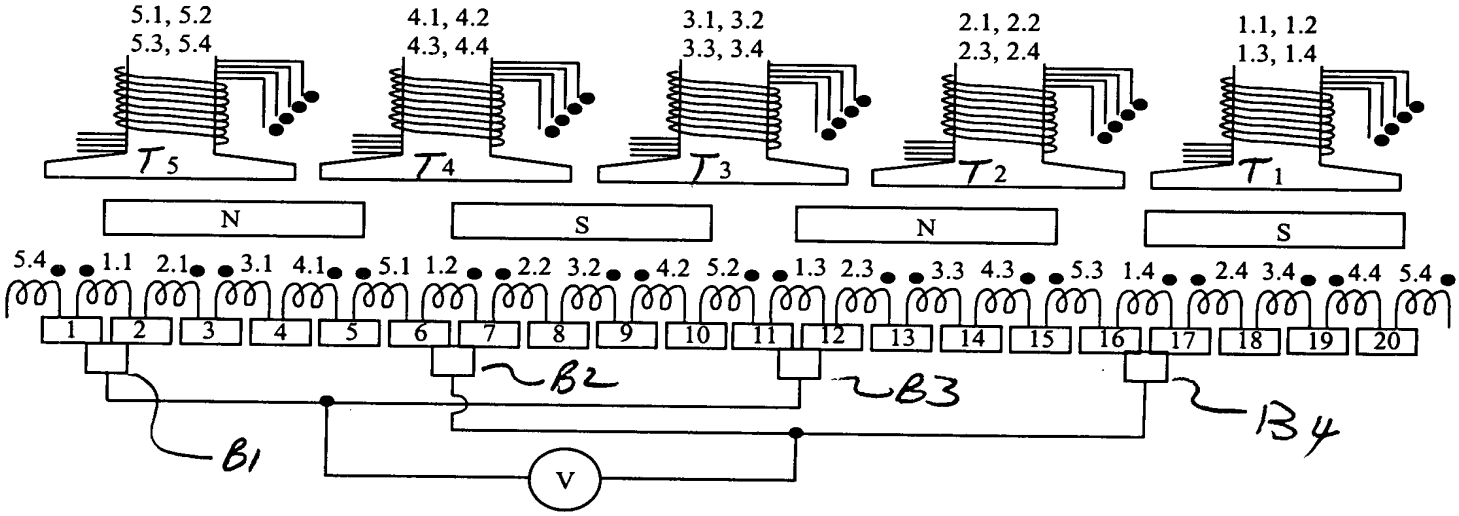


Fig 9 : Diagram of a machine with 5 rotor slots, 4 stator poles, 20 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth

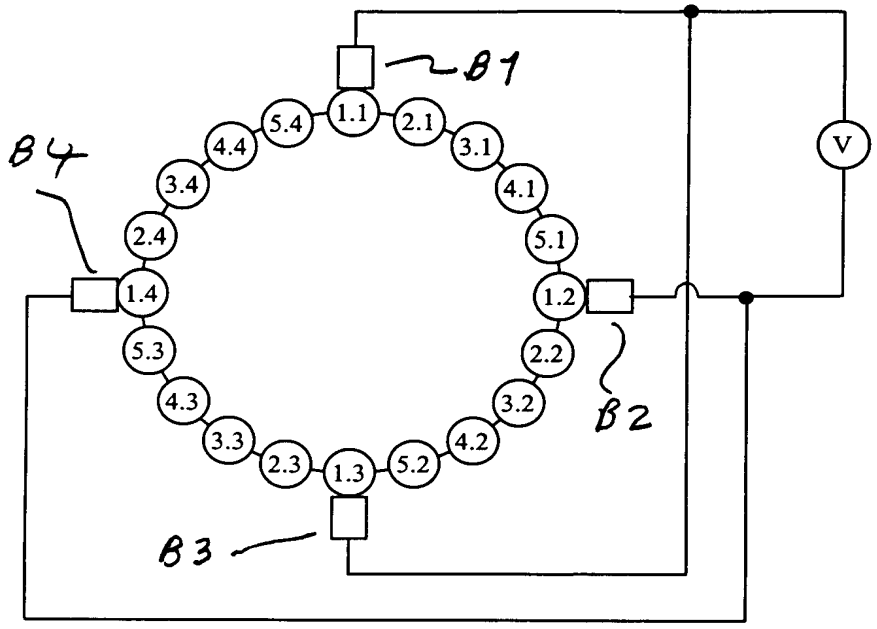


Fig 10 : Diagram of the parallel coils paths of machines presented in fig 7 and fig 9

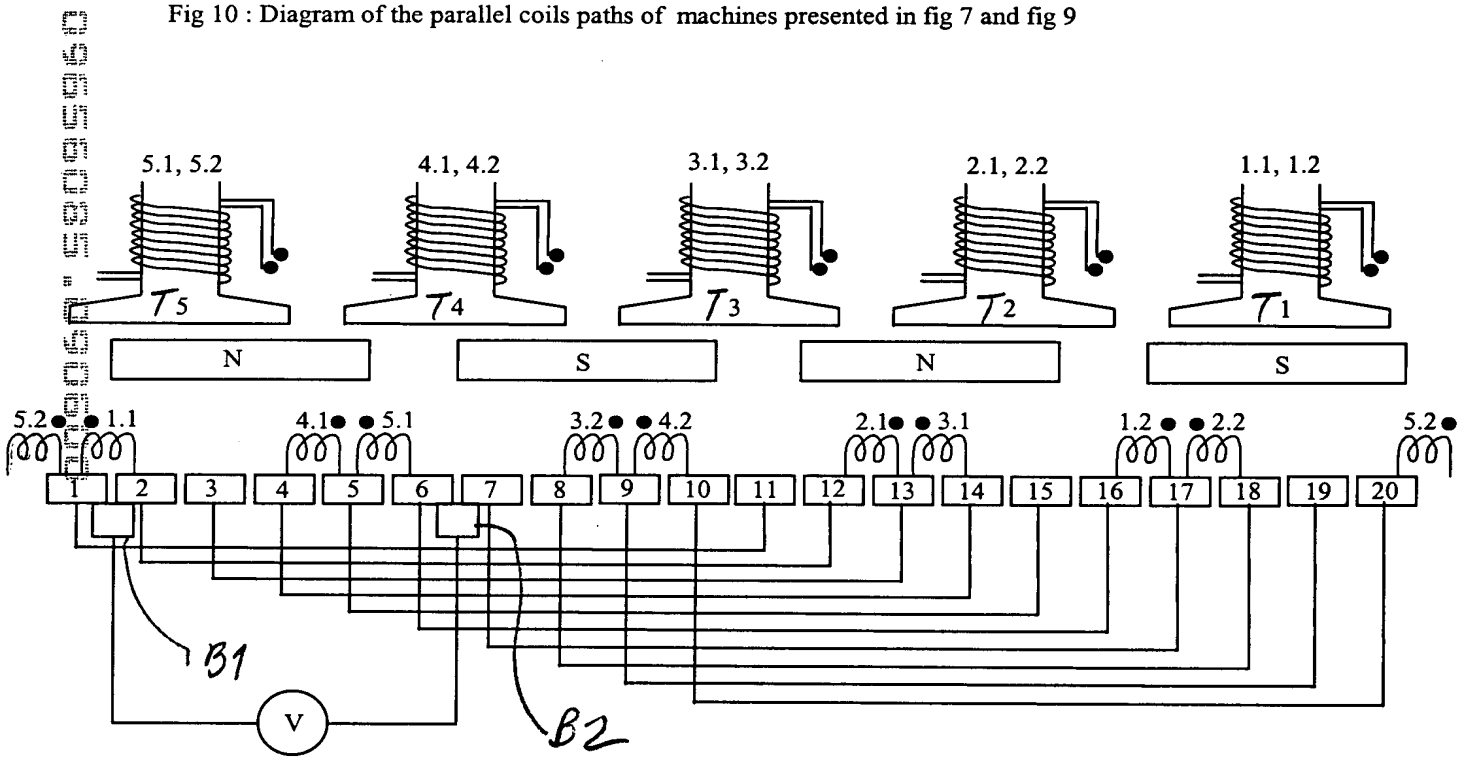


Fig 11 : Diagram of a machine with 5 rotor slots, 4 stator poles, 20 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth and equalizer connections on the commutator

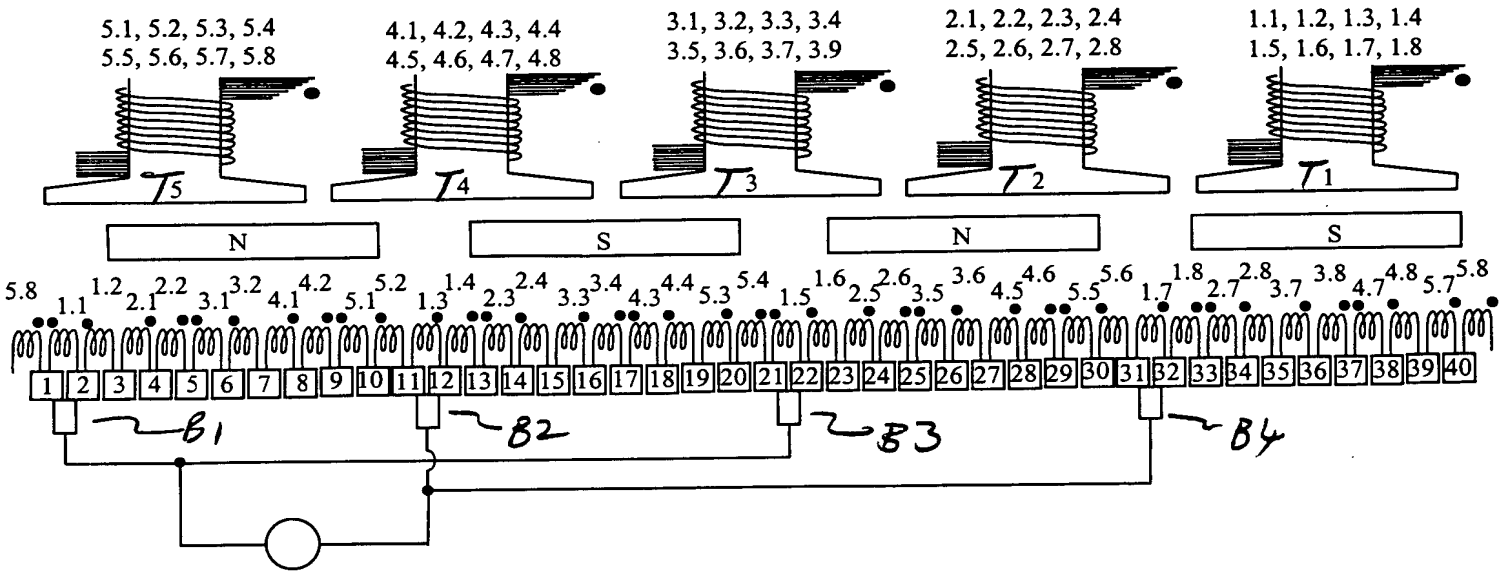


Fig 12 : Diagram of the machine with 5 rotor slots, 4 stator poles, 40 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth

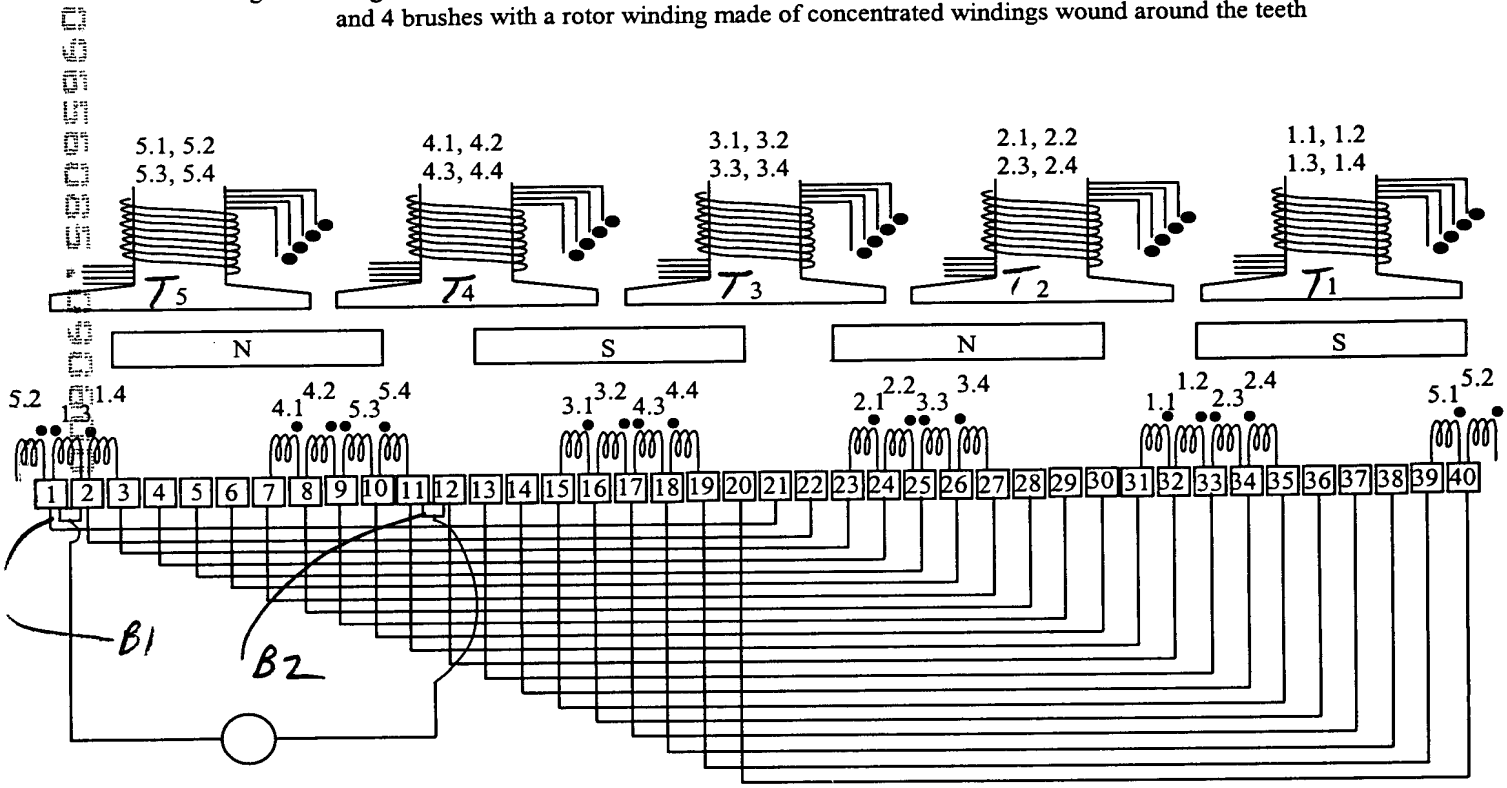


Fig 13 : Diagram of the machine with 5 rotor slots, 4 stator poles, 40 commutator segments and 2 brushes with a rotor winding made of concentrated windings wound around the teeth and equalizer connections on the commutator

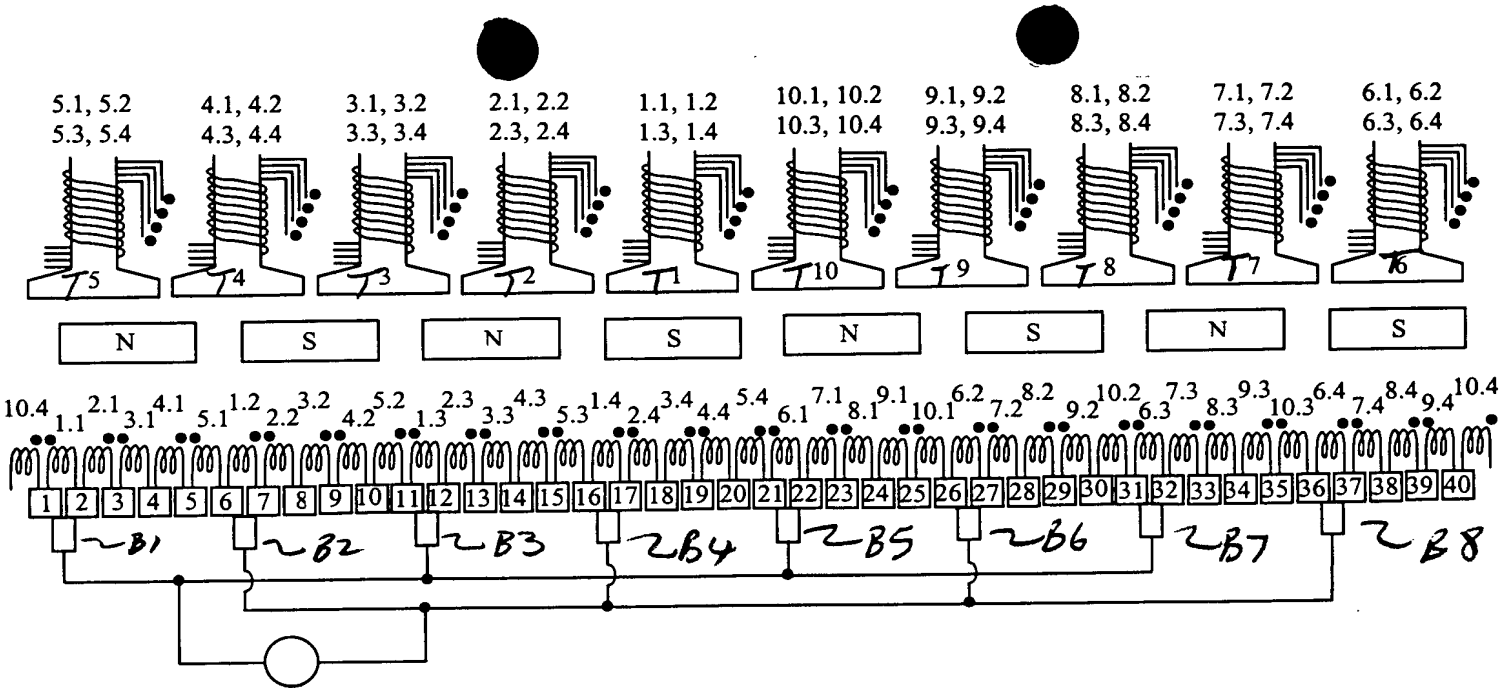


Fig 14 : Diagram of a machine with 10 rotor slots, 8 stator poles, 40 commutator segments and 8 brushes with a rotor winding made of concentrated windings wound around the teeth

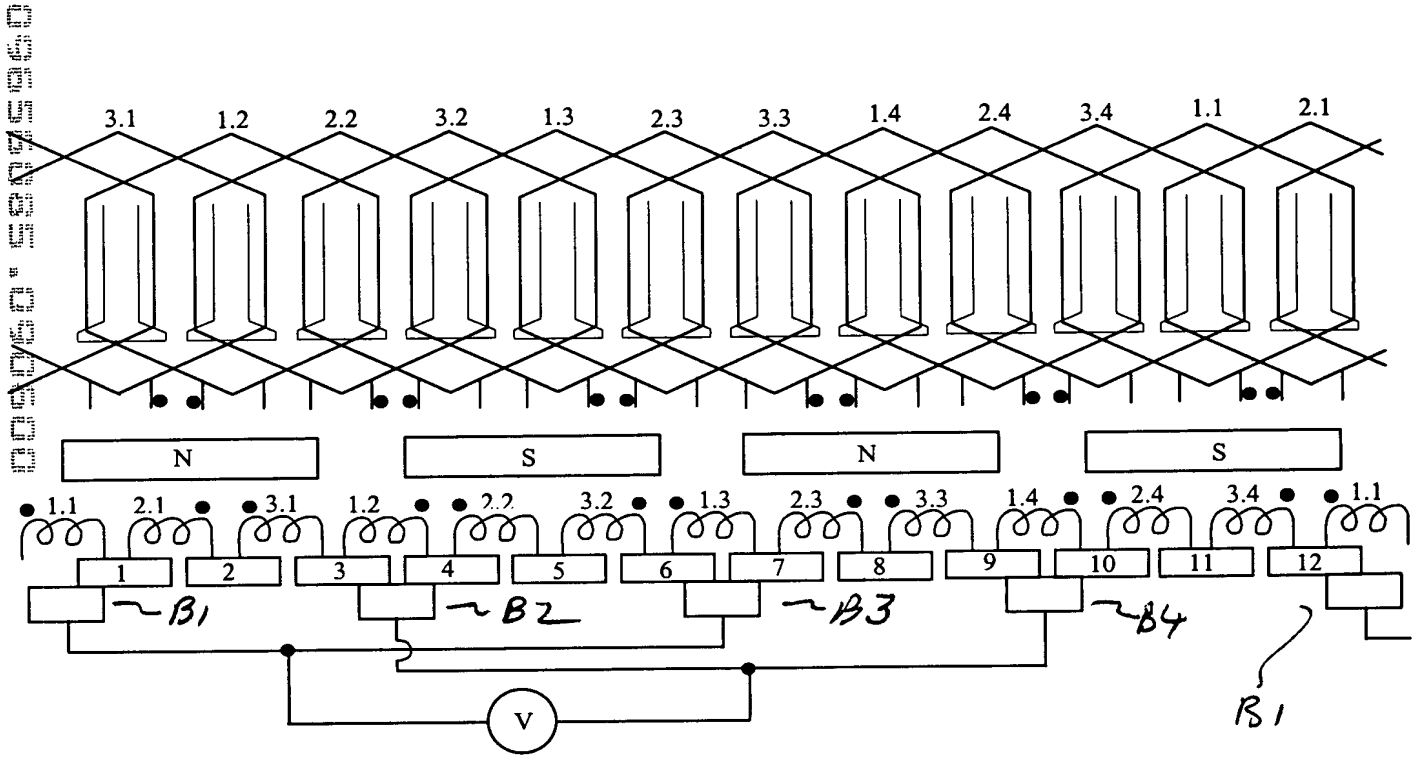


Fig 15 : Diagram of a machine with 12 rotor slots, 4 stator poles, 12 commutator segments, 4 brushes with a lap winding and a diametral pitch

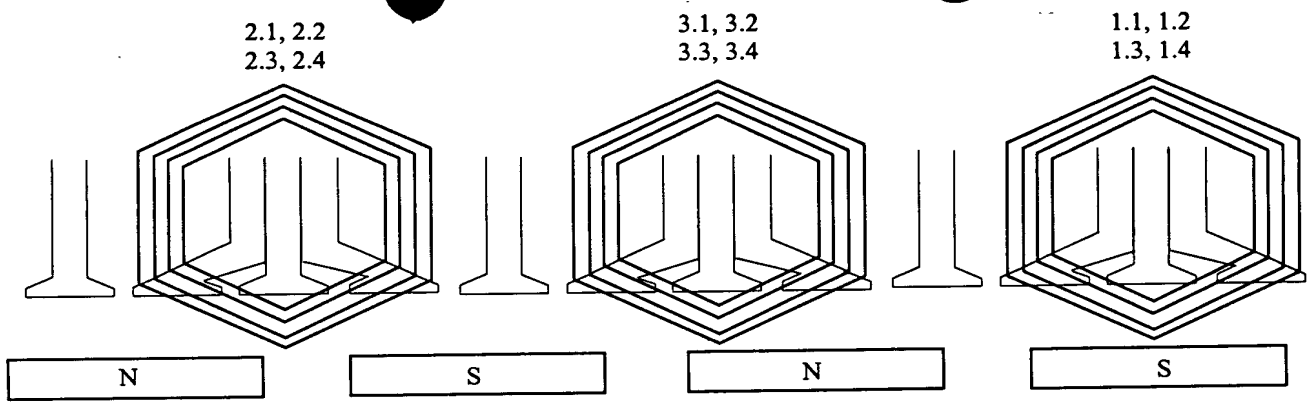


Fig 16 : Diagram of construction of a machine equivalent to the machine of Fig 15 with a rotor winding made of concentrated windings wound around the teeth

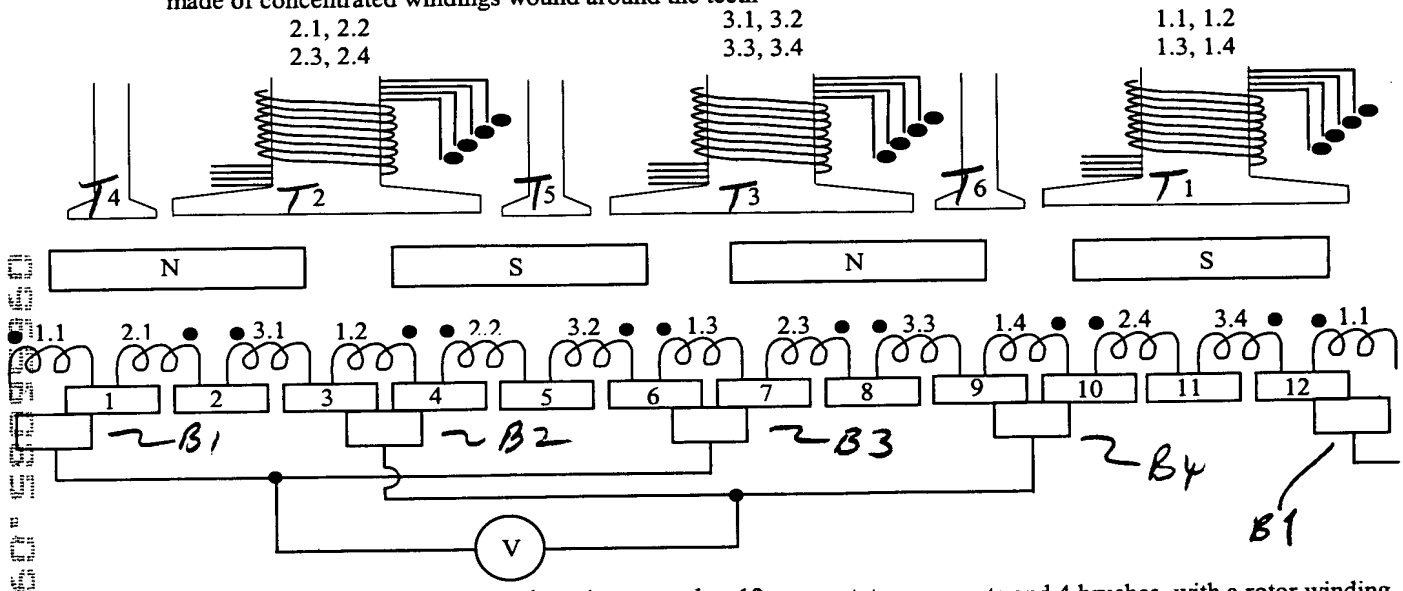


Fig 17 : Diagram of a machine with 6 rotor slots, 4 stator poles, 12 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth and a regular distribution of rotor teeth with two different dimensions

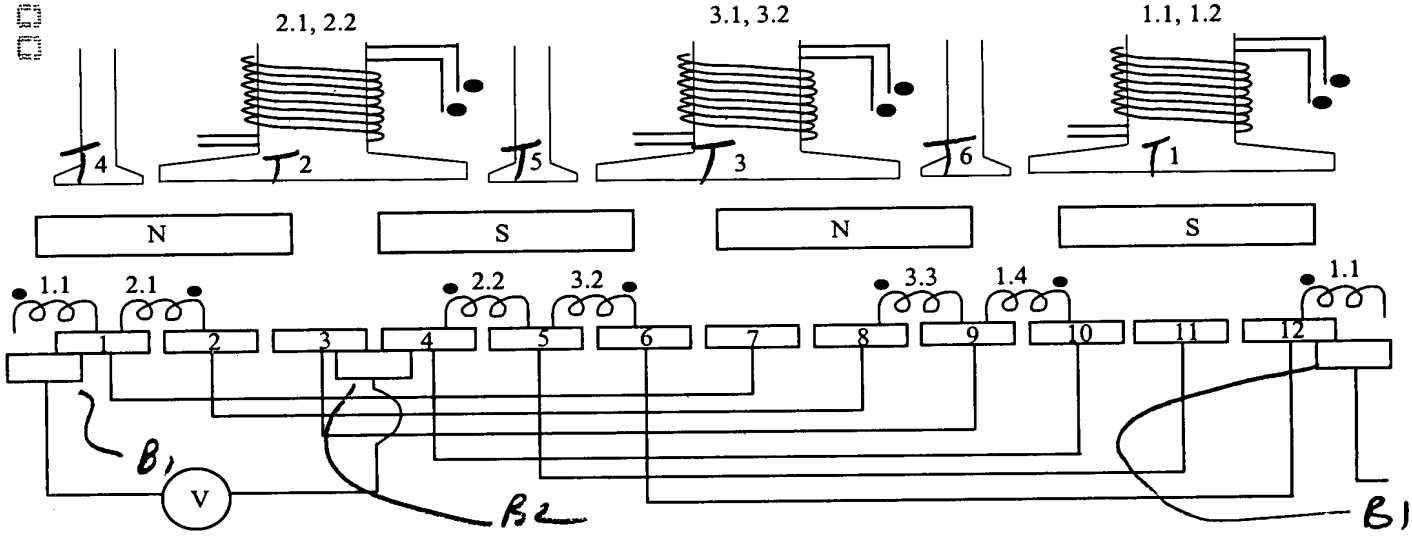


Fig 18 : Diagram of a machine with 6 rotor slots, 4 stator poles, 12 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth, a regular distribution of rotor teeth with two different dimensions and equalizer connections on the commutator

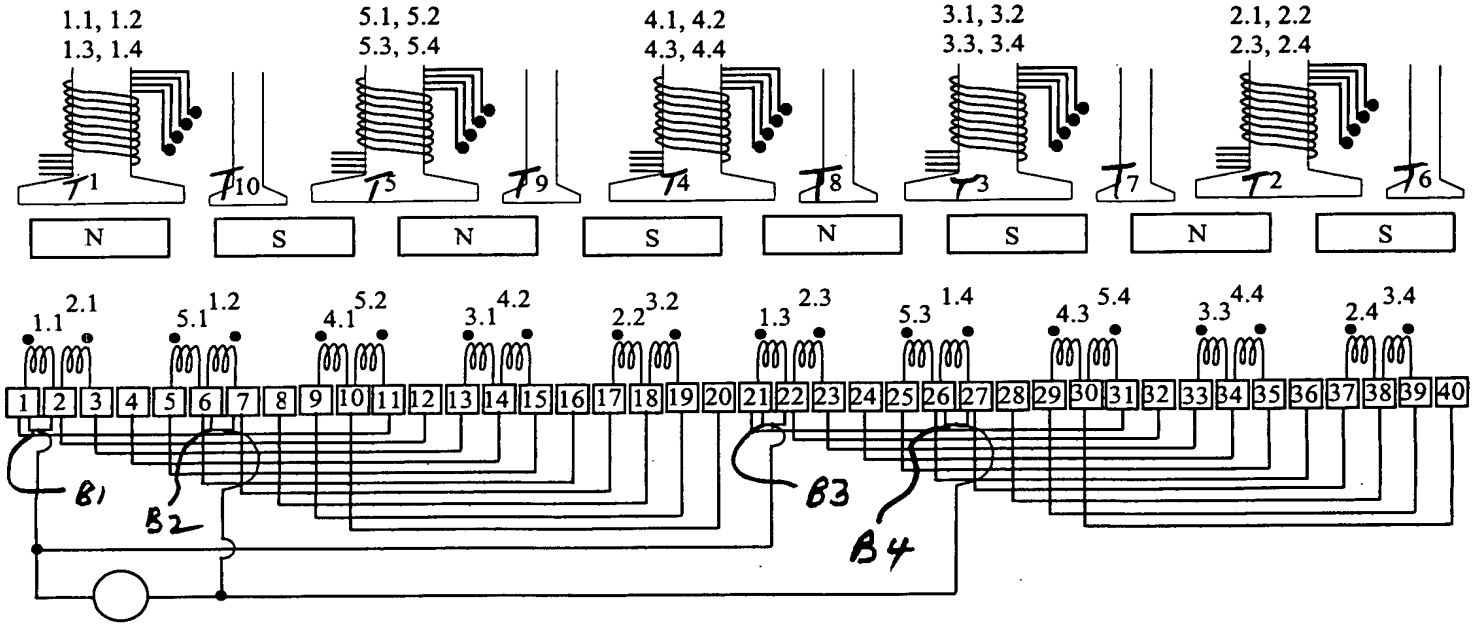


Fig 19 : Diagram of a machine with 10 rotor slots, 8 stator poles, 40 commutator segments and 4 brushes with a rotor winding made of concentrated windings wound around the teeth and equalizer connections on the commutator

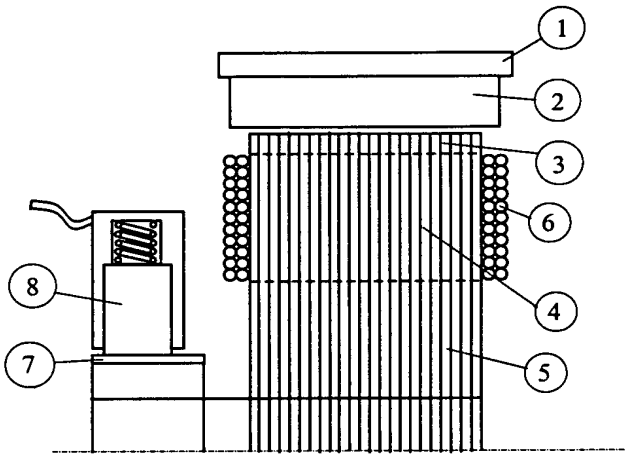


Fig 20 : Axial sectional view of a Permanent Magnet Direct Current motor with a reduced axial length (rotor made of laminated material)

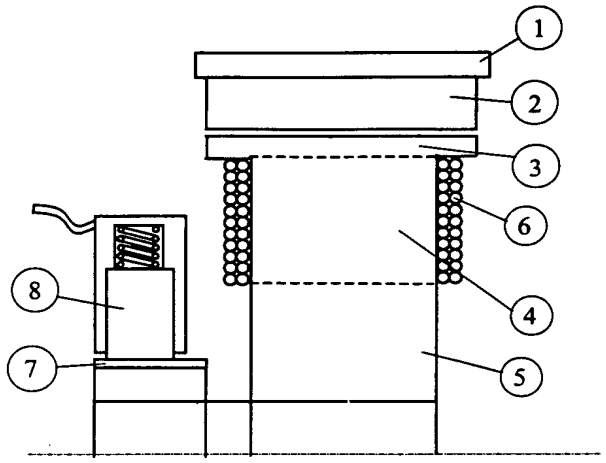


Fig 21 : Axial sectional view of a Permanent Magnet Direct Current motor with a reduced axial length (rotor made of soft magnetic composite material) and with a length of the tooth tips identical to the length of the permanent magnets.

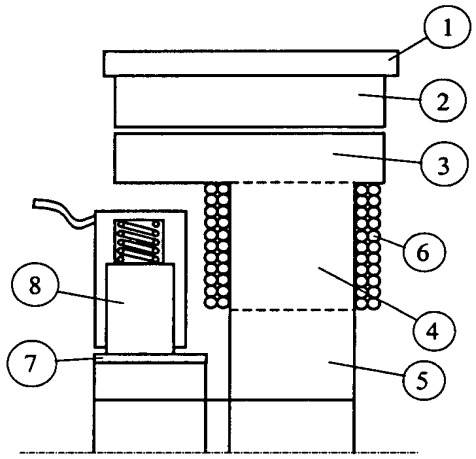


Fig 22 : Axial sectional view of a Permanent Magnet Direct Current motor with a reduced axial length (rotor made of soft magnetic composite isotropic material), and with the endwindings and commutator axially inserted